

Scientists and Public Responsibility

By Allen V. Astin



Allen V. Astin, director of the National Bureau of Standards, presented the following address on September 6th at the banquet held during the West Coast meeting of the American Physical Society in Boulder, Colo.

A MEETING of the American Physical Society in Boulder, Colorado, is an occasion that brings considerable pleasure to the physicists of the National Bureau of Standards. We value highly the long traditional association of the Society's Washington spring meeting with the Bureau. We naturally regret that the rate of growth of the Society over the past fifteen to twenty years has so completely out-distanced the growth of the Bureau's facilities to accommodate meetings that almost all the Society's technical sessions now have to be held elsewhere. When the radio and cryogenic engineering branches of the Bureau were located here a few years ago, one of our major hopes was that the Bureau, in conjunction with the University of Colorado, would provide a sufficient nucleus of scientific interest that the larger professional societies could be induced to meet here occasionally with the magnificent natural attractions of the area offering only fringe benefits.

The latter part of this summer, which marks the third anniversary of the formal dedication of the Bureau's Boulder Laboratories by President Eisenhower, has seen a most satisfactory fulfillment of these hopes. About three weeks ago we were hosts to a large cryogenic engineering conference involving about four hundred and fifty participants. During the two weeks ending yesterday the International Scientific Radio Union was meeting here. Present were more than 500 delegates from 26 nations. This was the first international meeting of URSI in the United States since 1927. And now as a climax to these important events, at least

from the point of view of the physicist, we have the 1957 summer meeting of the American Physical Society.

From my personal standpoint I appreciate very deeply this opportunity to speak to the members of the American Physical Society on the occasion of their first meeting here since the Boulder Laboratories of the National Bureau of Standards were established. Partially perhaps as an indirect reminder of the fact that part of the Bureau is still in Washington, I have chosen to speak on the subject of scientists and their public responsibility.

Subsequent to the selection of this topic I reviewed some of the literature and as usual found that the subject has already been quite thoroughly covered. Although many widely divergent views have been expressed, there appears to be remarkable agreement on a number of points. Some of the papers such as Joel Hildebrand's address to the American Philosophical Society in 1954¹ and Warren Weaver's presidential address to the American Association for the Advancement of Science in 1955² coincide so closely with my own views that my initial reaction was negative to trying to add anything to this subject. Further reflection however convinced me that a few additional and constructive observations might be made with some emphasis on the role of the scientist in the public service. Relatively little has been heard from the federal career scientists in the much that has been said and written about public responsibility of scientists.

I should like to begin this subject by a brief outline

of the points of view I plan to support. First of all, I support the contention that scientists are ordinary human beings with essentially the same virtues and deficiencies that most people have in varying degrees. As citizens they have substantially the same responsibilities as all other citizens but with some qualifications more of degree than of kind. Next, it seems to me that in the more direct contacts of scientists with the public their primary responsibility is to interpret as clearly, accurately, and simply as possible the nature of their work and its technical implications and limitations. Third, I believe that the greatest contribution that scientists individually or collectively can make to the public good is to do well their work as professional scientists. Finally, I should like to suggest that for those scientists who have special motivation to assume some direct public responsibility there are important and unique opportunities in the federal service either as full-time career employees or as temporary or part-time experts and advisors. I should now like to discuss these points in order.

IT seems almost superfluous to argue that scientists are really ordinary people. But there seems to be a considerable effort to set them apart as supermortals with either benevolent or malevolent functions according to the thesis at hand. The literature is filled with numerous examples expressing this point of view. I believe that others have so effectively clarified the true situation that I should like to dismiss this point with a single quotation. I think it is necessary to settle this matter first because the responsibilities of supermen would differ substantially from those of ordinary men. A. V. Hill, while he was president of the British Association for the Advancement of Science, made a statement which has been used extensively by others and I shall use it again:³

"I do not believe that there is such a thing as 'the scientific mind'. Most scientists are quite ordinary folk, with ordinary human virtues, weaknesses, and emotions. A few of the most eminent ones indeed are people of superlative general ability, who could have done many things well; a few are freaks, with a freakish capacity and intuition in their special fields, but an extreme naïvete in general affairs. . . . The great majority of scientists are between these groups, with much the same distribution of moral and intellectual characteristics as other educated people. By and in their scientific work they have developed the habit of critical examination, but this does not save them from wishful thinking in ordinary affairs, or sometimes from misrepresentation (even occasionally from treachery and falsehood) when their emotions or political prepossessions are strongly enough involved. . . . I would urge that scientific people do not get an exaggerated idea of their importance or of their moral superiority, but regard themselves as citizens who have the same moral obligations of honesty, kindness, courage, and tolerance as others. They have no more right to insulate themselves from the common affairs of life, or the common obligations of citizenship, than have other

people. If they have political aspirations, or a mission to improve mankind, let them follow these as citizens, not claiming scientific fame or notoriety as justification for public pronouncements on unrelated matters. The integrity and prestige of science are common property and must not be exploited for selfish ends. And scientists should be implored to remember that, however accurate their scientific facts, their moral judgments may conceivably be wrong."

THE need for clarifying the essential characteristics of scientists as human members of society is closely related to the need for increased understanding of the nature of science and its impact upon society. This brings me to my second point concerning the important responsibility of scientists to inform and educate the public about their work. In justification of the importance of the scientist's responsibility in this connection I think no more need be done than refer you to what has been previously said by others. James B. Conant, Warren Weaver, Dael Wolfe, Glenn Frank, J. Bronowski, and L. R. Hafstad, among others, have expressed themselves strongly on this matter.⁴ Because their choice of words is probably closest to what I have in mind, I would like to quote briefly from remarks by Frank and Bronowski.

Frank points out:

"The practical value of every social invention or material discovery depends upon its being adequately interpreted to the masses. The future of scientific progress depends as much on the interpretative mind as it does upon the creative mind. . . . The interpreter stands between the layman, whose knowledge of all things is indefinite—and the scientist, whose knowledge of one thing is authoritative. . . . The scientist advances knowledge. . . . The interpreter advances progress. . . . History affords abundant evidence that civilization has advanced in direct ratio to the efficiency with which the thought of the thinkers has been translated into the language of the masses."

and Bronowski suggests to the scientist that:

"Outside his laboratory, his task is to educate us in what goes on inside it, and to give it a meaning for us. In a world in which statesmen as much as voters are ignorant of the simplest implications in science, this is a formidable responsibility. . . . the scientist has no other choice today but patiently to become a teacher, in a world in which distrust and prejudice are free. . . . There is no alternative to an informed public opinion: and that can exist only where scientists speak to voters and voters accept their responsibility, which is to listen, to weigh, and then to make their own choice."

To implement the conclusion that scientists have an important responsibility to communicate with the public many suggestions have been offered involving both individual and collective action. It is my feeling that substantial results toward meeting this public responsibility of scientists can be achieved through the action of the appropriate professional societies of the scien-

tists. The American Institute of Physics, which represents the great majority of physicists within the United States, has as one of its important purposes "to serve the public by making available to journals, newspapers, and other channels of public information reliable information as to physics and its progress". In implementing this purpose, the Institute's Governing Board has been increasingly concerned with the need for better public understanding of the nature both of physics and of physicists. Some steps have been taken, but the real attack on this problem as well as others confronting the Institute such as the mounting problem of publishing technical papers requires additional money. It would seem to me that if the physicists of this country are seriously concerned about assisting in meeting some of their public as well as professional responsibilities, then here is an excellent opportunity to make a specific contribution. An appeal for funds was made about a year ago to the 16 000 individual physicists whose professional societies operate the American Institute of Physics. Yet less than one physicist in eight has responded, as of a month ago. It might be of interest to note in passing that back in 1943 when the AIP conducted a similar campaign to raise funds for a headquarters building, approximately half of the physicists in the country responded and the average size of their gifts was larger than in the present campaign even with 1943 dollars. The lack of response in the present case may be due to indifference, or due to disagreement with the objectives of the proposed program, but in either case it is neglect of an opportunity to demonstrate public responsibility. I suggest that the assumption of professional responsibilities by scientists, first in seeking the election of professional society officers who reflect their views and next in supporting these officers in the carrying out of official society programs, is one of their essential public responsibilities.

SINCE the importance of a greater understanding of the nature of science really follows from the importance of science itself to public welfare and human progress, much of what I have already said or quoted is relevant to my next point. I stated earlier my belief that the greatest contribution which scientists can make to society is to do well their work as professional scientists. To an appreciable extent this point is self-evident because without science there is little need for interpreting science unless perhaps a moratorium on science is declared. Concerning this alternative, I agree with Hildebrand that the only way to make a moratorium on science effective would be to liquidate the scientists "because scientific curiosity in the best scientists is ineradicable".¹

Related to this point is the frequently made suggestion that scientists should consider the social or moral consequences of their work before undertaking it. Here, I think it is necessary to distinguish between basic and applied science or engineering.

In basic science, which is concerned with increasing our understanding of the unknown, I see no meaning

to the argument that consequences should be considered ahead of time unless one is willing to take the position that ignorance is a better basis for public or private action than knowledge and truth. In the words of E. Bright Wilson, "Let those who decry science come out into the open and say they prefer ignorance to understanding, darkness to light."⁴

In applied science and engineering, on the other hand, one knows quite specifically the material, device, or system the development of which is a direct objective. Hence, it is meaningful to argue that one should consider the impact of the item under development upon society. But in making such considerations there is nothing unique about the scientists since I believe that all serious minded and conscientious workers whether they be scientists or nonscientists like to believe in the importance and value of what they are working on. Usually, the decision to undertake the development or production of a specific object is made in industry or government. If one feels that the decision is unwise in terms of its possible detrimental effect upon society, then it is the right and duty of all citizens in a democratic society who are so convinced—scientists and nonscientists alike—to seek to alter the decision. In a technological society there are of course many occasions for the scientist to provide the interpretation of the technical consequences of a specific development, but it is society's responsibility as a whole to decide whether the development is proper. Here, Alexander Haddow has provided an excellent summary:⁵

"In all cases the total social duty of contribution is the sum of three factors: (a) as scientist, the objective provision of new knowledge, without regard to its use for good or ill; (b) as scientist, the appreciation not only of the facts, but also of their implications and possible consequences—again regardless of choice; (c) as citizen, the political choice between one or other course of action. In the larger number, the scientist's contribution will be little if at all greater than that of the average citizen; and it would be absurd to expect all scientists to have the inclination, or even the energy, to concern themselves unduly. When, however, the individual approaches the ideal of the true scientist, when he is more and more able to apply in his ordinary life the standards of objectivity he brings to his specialized field, then may he be regarded as having acquired a special value as scientist, and a special responsibility as citizen. His responsibility is, however, by no means exclusive, since it attaches to all men, nor is it truly scientific."

I should next like to mention my belief that scientists, quite apart from the more direct material consequences of their work, can have an important influence for good upon a troubled and divided world merely by pursuing their professional interests. One of the hopes for peace, as has been explained by President Eisenhower in announcing the People to People program last year, is to increase the communication and understanding among the people in the various nations of the world. Here, the International Geophysical Year offers a great opportunity. In this program we find

thousands of scientists from all of the large and most of the small nations of the world working together, meeting together towards a single objective—namely, to increase our understanding of the planet on which we live. Fortunately also, this program has had the strong and generous support of the major national governments. In developing the IGY program many different and frequently conflicting points of view were involved. But the existence of an overriding common purpose provided the means and incentive to resolve the differences.

It seems to me that one of the aspects of the search for peace is to find additional areas where other common working objectives can be established on a worldwide basis. The recent URSI meeting which I referred to earlier would most certainly fall in this category.

The example of science as a means stimulating broad international understanding regardless of national or racial prejudices was the subject of an excellent editorial in *Life* magazine last winter. The editorial concluded with the suggestion, "Other professions please copy."⁶

NOW, I should like for the remainder of this talk to concentrate on the role of the scientist in Government. I believe this provides a special opportunity to exercise responsibility to society. Just as the scientist may consider himself a citizen with special knowledge, so the Government scientist may consider himself as the civil servant with special and important responsibilities. Although the Government scientist has sometimes been maligned, it is my opinion that nowhere is there greater opportunity for service to society by scientists than in Government. And, contrary to what I have heard on many occasions, nowhere is there greater opportunity to pursue scientific interests than in the Government service. It is not my belief that the Government trades on its purchase of scientific consciences. Those who emphasize the cases where scientists have suffered on the Government payroll are doing the Government and Government-science a disservice. I say this knowing full well the implications of this statement in relation to my own personal history. I wish to emphasize that during my own 25-year-long Government career there has been considerable opportunity to work on things which interested me principally, and I have felt, throughout that career, that the work I was doing had more general social value and somewhat more scientific value than that I might have undertaken under other conditions. This sort of satisfaction I believe is repayment for much of the so-called disadvantages of Government employment you hear so much about.

Now let me get back to the public responsibility of the scientist in the Government service. The Government scientist plays a key role, I believe, in the following three capacities: as research investigator, as scientific administrator, and as scientific advisor. As a research scientist he conducts the research projects which have been authorized by the Congress and the

Administration who in our society represent the will of the people. Here his public responsibility is quite clear. He must do as good a research job as possible. He must be as objective as he can be and as efficient. This is consistent with both good public service and good scientific practice. The question as to the ultimate social use of the scientist's findings is not a question bearing on the job nor upon civic responsibility. Considerations as to good or evil are not compatible with scientific investigation as suggested earlier. They belong to society as a whole. If the scientist wishes to consider such a problem he must do so as citizen not as scientist or Government worker. Furthermore there is always an ambiguity in any consideration of the moral value of a research project which, I believe, limits the objectivity by which it is approached. The Government research scientist like all other scientists is asked chiefly to concentrate on a scientific problem in as objective a manner as possible. And it may be truly said that most of his studies are straightforward science without any sinister moral overtones.

The Government science administrator has a more direct role in relation to public responsibility. He is the one who follows or controls whole scientific programs. He is more frequently aware of the relationship of these programs to policy objectives established by the Congress or by his administrative superiors. Usually the science administrator in Government must deal with the nonscientist in Government. In this sense he is a link between research and public policy. In this respect his public responsibility is especially significant. He has the opportunities to educate and to bring his special knowledge to bear on those carrying out the people's mandate. In one manner of speaking, the administrator of science programs has the principal opportunity to place the facts before elected and appointed officials. This is a vital public responsibility. It makes the Government scientist's job one of the most challenging and potentially rewarding. My own observations about scientists who have accepted these responsibilities are encouraging. I think they exhibit a fine combination of scientific integrity, administrative ability, and public responsibility. They are, by and large, mature, tactful, and relentlessly objective.

It is also characteristic of these men in Government science administration that they have come to avail themselves of the best judgments and data from the total scientific community. Thus, they have been able to link Government science with research undertaken elsewhere. Thus, they have been able to introduce general scientific opinion into the areas of public policy. Those of us who complain about advisory committees and technical study panels may have forgotten that these are the mechanisms through which the nation's scientific resources and talent are brought to bear upon Government science programs.

This brings me to the Government science advisor: Whether he serves the Government on a part- or a full-time basis, his is an important job, especially in terms of public responsibility. His service is that of an expert

who is called upon to exercise his very special knowledge in the public behalf. True, his goals are specified and his decisions limited, but in the area of his specialty, his judgments are valued and relied upon. His importance to public policy is directly related to the level of administration which he serves. On every level, however, he can make contributions to fulfilling the mission in science which Congress has assigned to the Government.

In any of these three activities, scientific objectivity is requisite. If the elected officials of Government are to carry out the programs of the people, if they are to make judgments on behalf of the public, they must have factual information and they must be able to understand the implications of these facts. In the area of science and technology, this is one of the public responsibilities of the Government scientist. Today it is becoming more and more evident that scientists are being called upon not only as advisors or in strictly scientific roles, but also in other official capacities. Their insight into various problems, other than that of science, is being valued. This is in itself indication of the growing public responsibility of scientists.

In closing, I should like to make these observations about the Government scientist. He is, by and large, devoted to science and to the public service and he seldom finds the two incompatible. He is rarely asked to undertake a scientific problem which is abhorrent to him. He is never forced to do so. He feels that in working for the Government he is also fulfilling a public responsibility, thus serving society. These scientists who are associated with national defense programs would seriously challenge anyone who questioned their loyalty to science or willingness to serve the social good. The scientist in Government, whether he is engaged in basic research or weapons development, serves the will of the democratic majority and is thereby, in a most direct way, fulfilling a public trust.

I would like, in addition, to re-emphasize that a most effective way for the scientist—and in particular the physicist—to discharge an important part of his public responsibilities is to participate actively in the affairs of his professional society and to support its efforts to communicate the results and significance of scientific work to the community at large.

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